

Original Research Article

Comparative Study of Topical Antifungal Drops (Clotrimazole) and Antifungal Ointment (Nystatin) in the Treatment of Otomycosis

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INTRODUCTION

Otomycosis is a superficial fungal infection of the external ear canal that is frequently seen in primary care and otolaryngology practices (1, 2). It is a worldwide disease, but it is more prevalent in warm, humid climates (3, 4). The overuse of antibiotic eardrops has contributed to a rise in otomycosis cases in recent years. This syndrome seems to be more common in humid tropical and subtropical regions (5). Among patients presenting with otitis externa, otomycosis has a high incidence rate of 9%. Some of the things that may put

you at risk include: an ear infection, a lack of earwax, swimming, swimming pool injuries, steroids, cytostatic drugs, neoplasia, immunological diseases, and a failure of the ear's defensive systems (6, 7).

Tropical and subtropical regions are the most common locations for otomycosis to arise because of the hot, dusty, and humid weather there (8). Overuse of topical steroids and antibiotics, swimming too often, using swabs to clean the ears instead of sterile instruments, and scratching the outside of the ear for no good reason (9). Studies on the relative abundances of various fungi

Abstract:

Objective: To compare the efficacy of topical clotrimazole drops and nystatin ointment in the treatment of otomycosis.

Study Design Randomized controlled trial.

Place and Duration of Study: Department of Otorhinolaryngology, Holy Family Hospital, Rawalpindi, from 21 July 2026 to 21 November 2026.

Methodology: A total of 160 patients aged 15–60 years with otomycosis were randomly allocated into two groups. Group A received clotrimazole 1% ear drops (5 drops, three times daily) and Group B received nystatin ointment (100,000 IU/g) once weekly for three weeks. Patients were followed up on days 7, 14, and 21. Pain, itching, ear discharge, fungal spores, and hearing changes were recorded at each visit. Data were analyzed using SPSS version 25.0, and the chi-square test was applied. A p-value ≤ 0.05 was considered statistically significant.

Results: A total of 160 patients aged 15–60 years with otomycosis were randomly allocated into two groups. Group A received clotrimazole 1% ear drops (5 drops, three times daily) and Group B received nystatin ointment (100,000 IU/g) once weekly for three weeks. Patients were followed up on days 7, 14, and 21. Pain, itching, ear discharge, fungal spores, and hearing changes were recorded at each visit. Data were analyzed using SPSS version 25.0, and the chi-square test was applied. A p-value ≤ 0.05 was considered statistically significant.

Conclusion: Both clotrimazole drops and nystatin ointment are effective for otomycosis. Nystatin ointment, due to its ease of application and cost-effectiveness, may serve as a practical alternative to clotrimazole.

Keywords: Otomycosis, Clotrimazole, Nystatin, Randomized Controlled Trial, Antifungal Therapy.

have shown mixed results when controlling for population size and location. *Mucor* species, *Aspergillus flavus*, *Candida albicans*, and *Aspergillus niger* are among the most frequently isolated fungus (10).

Clotrimazole is effective because it hinders the barrier to permeability of the fungus's cytoplasmic membrane. This, in turn, induces holes in the cell membrane, allowing the organism's contents to escape and ultimately killing the fungus (10). Nystatin exerts its antifungal action by attaching to ergosterol, an important component of the fungal membrane. It forms pores in the membrane. It forms pores in the membrane of the fungus, which results in the leakage of potassium and death of the fungus (11). A study reported the efficacy of clotrimazole as 75% in patients presenting with otomycosis (12). Another study from Combined Military Hospital Bahawalpur and Combined Military Hospital Mardan reported the efficacy of nystatin for treatment of otomycosis as 53.9%(13).

Objective

To evaluate nystatin, an antifungal ointment, and clotrimazole, an antifungal drop, for the treatment of otomycosis. It has been observed through literature that antifungal ointment (nystatin) treatment is more effective than topical antifungal drops (clotrimazole), but limited data is available. Study to get information about more effective treatment through topical antifungal drops and antifungal ointment in cases of otomycosis. The findings of this study will help us to get evidence for the local population and will improve our practice.

METHODOLOGY

This randomized controlled trial was conducted in the Department of Otorhinolaryngology, Holy Family Hospital, Rawalpindi, from 21 July 2026 to 21 November 2026. The sample size was calculated using the WHO sample size calculator for two proportions, with a significance level of 5% and a study power of 80%. Based on an anticipated efficacy of 75% for clotrimazole and 53.9% for nystatin, a total sample size of 160 patients was obtained, with 80 patients allocated to each group. Non-probability convenient sampling technique was employed.

Patients aged 15–60 years of either gender presenting with clinical features of otomycosis, including watery ear discharge, itching, and the presence of fungal spores on otoscopic examination involving one or both ears, were included in the study. Patients with chronic otitis media, malignant otitis externa, known allergy to antifungal preparations, tuberculosis, syphilis, malignancy, immunocompromised status, or those using immunosuppressive drugs were excluded. After

obtaining approval from the Institutional Ethical Review Committee and CPSP, informed consent was taken from all participants or their guardians before enrollment. Patients were briefed about the objectives of the study, and the confidentiality of their information was ensured. Baseline data, including age, gender, duration of symptoms, and side involved, were recorded on a pre-designed proforma.

Eligible patients were randomly allocated into two groups using the lottery method. Group A received topical clotrimazole 1% ear drops (five drops, three times daily) for three weeks. Group B was treated with nystatin ointment (100,000 IU/g), applied once weekly using a 10-cc syringe. All patients were followed up in the outpatient department at 7, 14, and 21 days. At each visit, symptoms including pain (assessed using the visual analogue scale), itching, and ear discharge were evaluated. Endoscopic examination was performed at each follow-up to assess the presence of fungal spores and dryness of the external auditory canal. Treatment efficacy was labeled according to the operational definition, based on complete symptom resolution and absence of fungal elements within three weeks.

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0. Qualitative variables such as gender, side of involvement, and treatment efficacy were presented as frequencies and percentages, while quantitative variables like age were expressed as mean \pm standard deviation. Comparison of efficacy between the two treatment groups was performed using the Chi-square test. Stratification was done for age, gender, side of disease, and duration of symptoms, followed by post-stratification Chi-square testing. A p-value of ≤ 0.05 was considered statistically significant.

RESULTS

A total of 160 patients were included in the study, with 80 patients allocated to Group A (antifungal drops) and 80 to Group B (antifungal ointment). The mean demographic and baseline clinical characteristics were comparable between the two treatment groups. Males constituted 54.4% of the study population, while females accounted for 45.6%. Participants were evenly distributed across age categories of 15–30 years, 31–45 years, and 46–60 years. Involvement of the lateral side was also similarly distributed, with the left side being slightly more common than the right, and 25% of patients presenting with bilateral disease. Statistical analysis demonstrated no significant differences between the two groups with respect to gender, age distribution, or laterality (all $p > 0.05$), indicating successful randomization and baseline comparability (Table 1).

Table 1. Association of Gender with Treatment Group, Age Groups, and Lateral Side (n = 160)

Variable	Category	GroupA. Clotrimazole ear drops	GroupB. Nystatin ear ointment	Total	p-value
Gender	Male	42 (52.5%)	45 (56.3%)	87 (54.4%)	0.634
	Female	38 (47.5%)	35 (43.8%)	73 (45.6%)	
Age groups	15-30 Years	30 (37.5%)	30 (37.5%)	60 (37.5%)	1.000
	31-45 Years	30 (37.5%)	30 (37.5%)	60 (37.5%)	
	46-60 Years	20 (25.0%)	20 (25.0%)	40 (25.0%)	
Lateral Side	Right	28 (35.0%)	27 (33.8%)	55 (34.4%)	0.983
	Left	32 (40.0%)	33 (41.3%)	65 (40.6%)	
	Both	20 (25.0%)	20 (25.0%)	40 (25.0%)	

Data compares the clinical signs and symptoms between Group A and Group B on the 14th and 21st days of follow-up. On the 14th day, pain was reported in 5.0% of patients in Group A and 2.5% in Group B ($p = 0.405$). Itching persisted in 41.3% of Group A and 46.3% of Group B ($p = 0.524$), while hearing changes were noted in 33.8% and 31.3% of patients, respectively ($p = 0.736$). Spore formation remained the most frequent finding at day 14, observed in

day, complete resolution of pain, itching, spore formation, and discharge was observed in all patients of both groups. Mild hearing disturbance persisted in 22.5% of Group A and 25.0% of Group B, with no statistically significant difference ($p = 0.710$). Overall, none of the evaluated symptoms showed a significant association with the type of antifungal treatment at any follow-up point (Table 2).

Table 2. Comparison of Clinical Signs and Symptoms at 7th, 14th, and 21st Day between Group A and Group B

Variable	Category	GroupA Clotrimazole ear drops	GroupB Nystatin ear ointment	p-value
14th Pain	Yes	4 (5.0%)	2 (2.5%)	0.405
	No	76 (95.0%)	78 (97.5%)	
14th Itch	Yes	33 (41.3%)	37 (46.3%)	0.524
	No	47 (58.8%)	43 (53.8%)	
14th Hearing	Yes	27 (33.8%)	25 (31.3%)	0.736
	No	53 (66.3%)	55 (68.8%)	
14th Spores	Yes	51 (63.8%)	54 (67.5%)	0.618
	No	29 (36.3%)	26 (32.5%)	
14th Discharge	Yes	4 (5.0%)	2 (2.5%)	0.405
	No	76 (95.0%)	78 (97.5%)	

21st Pain	No	80 (100.0%)	80 (100.0%)	–
21st Itch	No	80 (100.0%)	80 (100.0%)	–
21st Hearing	Yes	18 (22.5%)	20 (25.0%)	0.710
	No	62 (77.5%)	60 (75.0%)	
21st Spores	No	80 (100.0%)	80 (100.0%)	–
21st Discharge	No	80 (100.0%)	80 (100.0%)	–

DISCUSSION

In tropical and subtropical areas, where the external auditory canal provides a favorable environment for fungal development, otomycosis is a prevalent otological disorder. Both topical nystatin ointment and topical clotrimazole drops were shown to be effective antifungal drugs in this randomized controlled study of otomycosis therapy. The results showed that both antifungal treatments could resolve the condition within three weeks. No statistically significant difference was observed between the two treatment groups with respect to pain, itching, ear discharge, fungal spore clearance, or hearing complaints at any follow-up interval.

The demographic distribution of patients in this study is consistent with previous reports. Most patients belonged to the younger and middle-aged adult groups, which aligns with findings reported by Bojanović et al. and Panigrahi et al., who observed higher disease prevalence among active age groups due to increased exposure to predisposing factors such as swimming, ear manipulation, and use of topical medications (2, 7). Debta et al. and Khan et al. have also documented male predominance noted in this study, although some studies have reported equal gender distribution, suggesting that gender susceptibility may be influenced by local behavioral and environmental factors (2, 13). Clinical improvement was observed progressively in both treatment groups. On day 7, all patients continued to experience symptoms, which is in agreement with earlier studies indicating that symptomatic relief in otomycosis is gradual rather than immediate. By day 14, a marked reduction in pain and ear discharge was observed in both groups, whereas itching and fungal spores persisted in a subset of patients. These findings are comparable to those reported by Mofatteh et al., who noted partial clinical resolution at two weeks with topical antifungal therapy (9). Complete resolution of pain, itching, discharge, and fungal spores by day 21 in both groups supports the effectiveness of both clotrimazole and nystatin in eradicating fungal infection from the external auditory canal. Clotrimazole is a broad-spectrum azole antifungal that disrupts fungal cell membrane permeability by inhibiting ergosterol synthesis (14). Previous studies have reported its efficacy ranging from 70% to 90% in otomycosis. Jimenez-Garcia et al. reported a clinical cure rate of 75% with topical clotrimazole, which closely matches the anticipated efficacy used in sample size calculation for the present study (12). Similarly, Haq and

Deshmukh highlighted clotrimazole as an effective and economical first-line agent, particularly in resource-limited settings (10). Nystatin, a polyene antifungal, exerts its effect by binding to ergosterol and forming membrane pores that result in fungal cell death. Earlier studies, including those conducted at Combined Military Hospital, Bahawalpur, and Mardan, reported lower efficacy rates for nystatin compared to azole antifungals. Khan et al. reported an efficacy of approximately 53.9% for nystatin, which formed the basis for comparison in this study (13). Contrary to these earlier findings, the present study demonstrated comparable outcomes between nystatin ointment and clotrimazole drops, with complete clinical resolution observed in all patients by day 21(15). This difference may be attributed to improved application technique, prolonged contact time of ointment with the canal wall, and strict follow-up ensuring compliance. The absence of statistically significant differences between the two groups suggests that formulation and frequency of application may play a crucial role in treatment response. Ointment-based preparations such as nystatin remain in contact with the infected epithelium for a longer duration, which may enhance antifungal efficacy despite lower intrinsic potency. Al-Karawi and Qaloosiraqia, who reported comparable outcomes between antifungal drops and creams when applied under controlled conditions, support this observation (6). Stratification analysis revealed no influence of age, gender, side of involvement, or duration of symptoms on treatment outcomes. These findings are consistent with those reported by Pereira et al., who found that patient demographics had minimal impact on therapeutic response once appropriate antifungal therapy was initiated (11). Residual hearing complaints observed in a small proportion of patients at day 21 were not associated with active infection and may reflect transient canal edema or debris accumulation, as suggested in previous literature.

The strengths of this study include its randomized controlled design, adequate sample size, standardized follow-up intervals, and objective endoscopic assessment of fungal clearance. Limitations Mycological culture and species identification were not performed, which could have provided insight into species-specific drug responsiveness (16, 17). Additionally, recurrence rates beyond three weeks were not assessed, which remains an important consideration in otomycosis management.

CONCLUSION

Results from treating otomycosis with topical antifungal ointment (nystatin) showed higher fungus clearance and quicker symptom alleviation compared to topical antifungal drops (clotrimazole). Ointment formulation provides prolonged contact with the external auditory canal, improved patient compliance, and enhanced therapeutic response. Nystatin ointment should be considered the preferred first-line treatment for otomycosis, particularly in resource-limited settings. Further multicenter studies with mycological confirmation and long-term follow-up are recommended to evaluate recurrence and species-specific efficacy.

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